

What is claimed is:

1. A method comprising:

receiving a packet of encoded data; and

decoding the packet using a look-up table that stores

5 information approximating output of an algorithmic decoding process.

2. The method of claim 1 including performing joint quantization of the data packet before decoding.

10

3. The method of claim 1 wherein data in the packet is encoded by turbo coding.

4. The method of claim 3 wherein decoding includes

15 processing the data packet using a parallel concatenated turbo decoder.

5. The method of claim 1 including decoding the packet using a table that stores information approximating output 20 of a soft-input soft-output algorithmic decoding process, a soft-input hard-output algorithmic decoding process, a hard-input soft-output algorithmic decoding process, or a hard-input hard-output algorithmic decoding process.

6. A method comprising:

- (a) receiving encoded symbols;
- (b) compressing the symbols;
- (c) decoding the compressed symbols using a first look-up table that stores information approximating output of an algorithmic decoding process;
- (d) arithmetically combining the compressed symbols with the decoded symbols to obtain a first result; and
- (e) decompressing the first result.

10

7. The method of claim 6 including:

- (f) interleaving the decompressed first result;
- (g) compressing the interleaved first result;
- (h) decoding the compressed, interleaved first result using a second look-up table that stores information approximating output of an algorithmic decoding process;
- (i) arithmetically combining the decoded first result with the compressed, interleaved first result to obtain a second result;
- (j) decompressing the second result; and
- (k) de-interleaving the decompressed second result.

20 8. The method of claim 7 including:

repeating (b) through (k) until predetermined criteria
is satisfied; and
determining information bits corresponding to the
received encoded symbols.

5

9. An apparatus comprising:

a memory storing a look-up table with information
approximating output of an algorithmic decoding process;
and

10 a processor configured to use the look-up table to
decode data packets encoded by convolutional coding.

10. The apparatus of claim 9 wherein the table stores
information approximating a soft-input soft-output

15 algorithmic decoding process, a soft-input hard-output
algorithmic decoding process, a hard-input soft-output
algorithmic decoding process, or a hard-input hard-output
algorithmic decoding process.

20 11. The apparatus of claim 10 including a joint
quantization module for converting soft symbols in the
packet into soft multi-symbols prior to the processor's
decoding the data packets using the look-up table.

12. The apparatus of claim 10 wherein the processor is configured to decode the packet by turbo decoding.

13. An apparatus comprising:

5 memory storing a first look-up table with information approximating output of an algorithmic decoding process;

and

a processor configured to

(a) compress a packet of received encoded symbols;

10 (b) decode the compressed symbols using the first look-up table;

(c) arithmetically combine the compressed symbols with the decoded symbols to obtain a first result; and

(d) decompress the first result.

15

14. The apparatus of claim 13 wherein the memory stores a second look-up table with information approximating output of an algorithmic decoding process and wherein the processor is configured to:

20 (e) interleave the decompressed first result;

(f) compress the interleaved first result;

(g) decode the compressed, interleaved first result using the second look-up table;

- (h) arithmetically combine the decoded first result with the compressed, interleaved first result to obtain a second result;
- (i) decompress the second result; and
- (j) de-interleave the decompressed second result.

15. The apparatus of claim 14 wherein the processor is configured to:

repeat (a) through (j) until predetermined criteria is

10 satisfied; and

determine information bits corresponding to the encoded symbols.

16. An article comprising a computer-readable medium that stores computer-executable instruction for causing a computer system, in response to receiving a encoded data packet, to use a look-up table that approximates output of an algorithmic decoding process to decode the packet.

20 17. The article of claim 16 including instructions for
causing the computer system to perform joint quantization
before using the look-up table to decode the packet.

18. The article of claim 16 wherein data in the packet to
be decoded was encoded by turbo coding.

19. An article comprising a computer-readable medium that
5 stores computer-executable instruction for causing a
computer system to:

- (a) compress a packet of received encoded symbols;
- (b) decode the compressed symbols using a first look-up table approximating output of an algorithmic decoding
10 process;
- (c) arithmetically combine the compressed symbols with the decoded symbols to obtain a first result; and
- (d) decompress the first result.

15 20. The article of claim 19 including instructions for
causing the computer system to:

- (e) interleave the decompressed first result;
- (f) compress the interleaved first result;
- (g) decode the compressed, interleaved first result
20 using a second look-up table approximating output of an
algorithmic decoding process;
- (h) arithmetically combine the decoded first result with the compressed, interleaved first result to obtain a
second result;

- (i) decompress the second result; and
- (j) de-interleave the decompressed second result.

21. The article of claim 20 including instructions for

5 causing the computer system to:

repeat (a) through (j) until predetermined criteria is satisfied; and
determine information bits corresponding to the encoded symbols.

10

22. The article of claim 16 including instructions for causing the computer system to decode the compressed symbols using a first look-up table approximating output of a soft-input soft-output algorithmic decoding process, a
15 soft-input hard-output algorithmic decoding process, a hard-input soft-output algorithmic decoding process, or a hard-input hard-output algorithmic decoding process.

23. A method comprising:

20 receiving a packet of encoded symbols;
jointly quantizing multiple symbols;
decoding the jointly quantized symbols to obtain a result; and

decompressing the result into individual decoded symbols.

24. The method of claim 23 including decoding the jointly
5 quantized symbols using a look-up table that approximates
output of an algorithmic decoding process.

25. The method of claim 23 including decoding the jointly
quantized symbols using a look-up table that approximates
10 output a soft-input soft-output algorithmic decoding
process, a soft-input hard-output algorithmic decoding
process, a hard-input soft-output algorithmic decoding
process, or a hard-input hard-output algorithmic decoding
process.

15
26. An article comprising a computer-readable medium that
stores computer-executable instruction for causing a
computer system, in response to receiving a packet of
encoded symbols, to:

20 jointly quantize multiple ones of the symbols;
 decode the jointly quantized symbols to obtain a
 result; and
 decompress the result into individual decoded symbols.

27. The article of claim 26 including instructions for causing the computer system to decode the jointly quantized symbols using a look-up table that approximates output of an algorithmic decoding process.

5

28. The method of claim 26 including instructions for causing the computer system to decode the jointly quantized symbols using a look-up table that approximates output a soft-input soft-output algorithmic decoding process, a
10 soft-input hard-output algorithmic decoding process, a hard-input soft-output algorithmic decoding process, or a hard-input hard-output algorithmic decoding process.